

# Pathoanatomical correlation of bladder sparing in cauda equina syndrome due to posteriorly sequestered lumbar disc herniation

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## ABSTRACT

The pathoanatomical explanation of lumbar disc herniation causing the rare cauda equina syndrome with sacral 2- sacral 4 roots sparing is not well described. A case report of bladder sparing cauda equina syndrome due to a large posteriorly sequestered lumbar disc fragment is presented. Magnetic resonance imaging of the lumbosacral spine showed herniation of a large disc fragment at lumbar 3-lumbar 4 deforming the thecal sac posteriorly, with the left side more affected than the right. Bladder sparing cauda equina syndrome can be explained by the anatomical organization of the nerve roots within the thecal sac. The medial sacral roots are not as stretched and strained by the herniating disc as the laterally placed lumbar roots. Early laminectomy and decompression of the thecal sac may relieve this stretch and strain on the nerve roots and therefore preserve bladder function.

**Keywords:** Bladder, cauda equina, sequestered, lumbar disc, herniation.

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**C**auda equina syndrome due to lumbar disc herniation is a rare entity constituting 1%-10% of the operated lumbar discs.<sup>1-3</sup> Patients usually present with low back pain associated with pain and weakness in both lower limbs, particularly below the knee, as well as bowel, bladder, and sexual dysfunction. Bladder function may not return if there is delay in surgical decompression. Bladder sparing cases of cauda equina are either very rare or are underreported in the literature.

**Case Report.** A 54-year-old man who was previously healthy, presented with severe low back

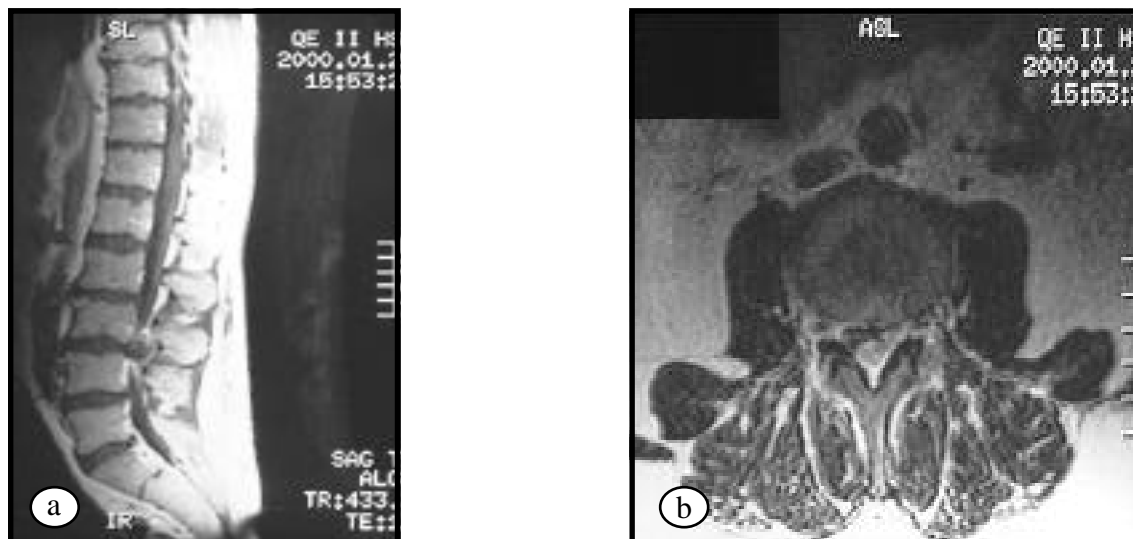
pain of 14 days duration associated with pain and weakness in both legs. He had preserved bowel and bladder function. The patient was transferred from a nearby hospital. Magnetic resonance imaging (MRI) of the lumbosacral spine showed a large lumbar (L) 3- L4 disc herniation (**Figure 1**). The next day in the operating room, a large sequestered disc fragment compressing the thecal sac posteriorly was removed and the intervertebral disc cleaned out. In the post operative period, the patient felt immediate pain relief in his legs as well as improvement in his leg function.

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**Figure 1 - (a) Sagittal and (b) Axial magnetic resonance imaging of the lumbosacral spine showing a large lumbar 3-4 disc herniation.**

**Discussion.** Literature search yielded only one report of sacral sparing with cauda equina compression from lumbar disc.<sup>4</sup> The authors showed experimentally that the central disc herniation led to increased linear strain on the more laterally placed roots than the medially placed ones which would compress the lumbar roots more than the sacral ones. Other authors believed that the sacral sparing was due to the triangular shape of the lumbar spinal canal where the more centrally situated sacral roots would be less compromised than the more laterally placed lumbar roots.<sup>5</sup> In Shapiro's report of 14 cases of cauda equina syndrome secondary to lumbar disc herniation, only one case of bladder sparing was listed and even in this case no further details were given.<sup>1</sup> The sequestered L3-L4 disc fragment in our patient was located in the posterolateral margins and correlated the pathology with the anatomy, as the last 2 lumbar and first sacral nerve roots were involved. This pathoanatomical correlation is further supported by a recent study of the intrathecal nerve root organization of the cauda equina at the L3-L4 level.<sup>5</sup> There is no certainty as to the proper timing of cauda equina decompression, however, it is generally agreed that there should be no delay in the

decompression once the diagnosis has been made.<sup>6,7</sup> Bladder sparing in cauda equina syndrome may be a major cause for early decompression of the thecal sac through a laminectomy rather than laminotomy as the latter may produce more traction and strain on the involved nerve roots.

## References

1. Shapiro S. Cauda equina syndrome secondary to lumbar disc herniation. *Neurosurgery* 1993; 32: 743-747.
2. Robinson R. Massive protrusion of lumbar disks. *Br J Surg* 1965; 52: 858-865.
3. Shepard R. Diagnosis and prognosis of cauda equina syndrome produced by protrusion of lumbar disc. *Br Med J [Clin Res]* 1959; 2: 1434-1439.
4. Lafuente DJ, Andrew J, Joy A. Sacral sparing with cauda equina compression from central lumbar intervertebral disc prolapse. *J Neurol Neurosurg Psychiatry* 1985; 48: 579-581.
5. Wall EJ, Cohen MS, Massie JB, Rydevik B, Garfin SR. Cauda equina anatomy I: Intrathecal nerve root organization. *Spine* 1990; 15: 1244-1247.
6. Delamarter RB, Stterman JE, Carr JB. Cauda equina syndrome: Neurological recovery following immediate, early or late decompression. *Spine* 1991; 16: 1022-1029.
7. Kostuik JP, Harrington I, Alexander D, Rand W, Evans D. Cauda equina syndrome and lumbar disc herniation. *J Bone Joint Surg* 1986; 68: 386-391.